CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION
ORDER NO. __

WASTE DISCHARGE REQUIREMENTS
FOR
MUSCO FAMILY OLIVE COMPANY AND THE STUDLEY COMPANY
WASTEWATER TREATMENT AND LAND DISPOSAL FACILITY
SAN JOAQUIN COUNTY

The California Regional Water Quality Control Board, Central Valley Region, (hereafter Central Valley Water Board) finds that:

1. Musco Family Olive Company and the Studley Company (hereafter jointly referred to as "Discharger") submitted a Report of Waste Discharge (RWD), dated 30 March 2009 to apply for revised Waste Discharge Requirements (WDRs) for land discharge of olive processing wastewater. Additional information was submitted on various dates in December 2009.

2. The facility is at 17950 Via Nicolo, Tracy, in Section 34, T2S, R4E, and Section 4 T3S, R4E, MDB&M, as shown on Attachment A, which is attached hereto and made part of this Order by reference. The Studley Company owns the land (Assessor's Parcel Numbers 209-11-18, 209-11-31, 209-11-32, 251-32-08, and 251-32-09) and Musco Family Olive Company owns and operates the facility.

3. Wastewater generated at the facility is regulated under two separate WDRs:

    a. Order No. R5-2005-0024 regulates two Class II surface impoundments that are regulated under Title 27 of the California Code of Regulations, §20005 et seq., (hereafter Title 27). The Class II surface impoundments are used to store and evaporate concentrated brines that have been determined to be designated waste.

    b. Order No. R5-2002-0148 regulates the treatment, storage, and land application of non-designated waste. This Order updates Order No. R5-2002-0148 and only applies to non-designated waste.

4. As set forth in the following findings, the Discharger proposes to continue the discharge of process wastewater to land.

REGULATORY BACKGROUND

5. Musco Family Olive Company processes approximately one-half the total table olive crop in the state. The facility began limited operations in 1983 and full operations in 1992.

6. On 28 February 1997, the Central Valley Water Board approved Resolution No. 97-037 approving an Initial Study and adopting a Negative Declaration to expand the land disposal areas to 200 acres. On the same date, the Central Valley Water Board adopted WDRs Order No. 97-037 authorizing process wastewater discharges of up to 500,000 gallons per day (gpd) on 200 acres of land application areas (LAAs).

7. In 1999, the Discharger acquired an olive packing facility in Visalia, closed that facility, and transferred the production to Tracy, without first making improvements to its existing wastewater treatment or disposal system. That consolidation lead to an increase in wastewater flow rates and numerous violations of WDRs Order No. 97-037. The Central Valley Water Board responded to the violations with the following enforcement actions, which are described in detail below:

   a. Cleanup and Abatement Order (CAO) No. 5-00-717;

   b. Time Schedule Order (TSO) No. R5-2002-0014-R01;

   c. Cleanup and Abatement Order No. R5-2002-0149;

   d. Administrative Civil Liability (ACL) Complaint No. R5-2002-0502 in the amount of $150,000 for failure to comply with CAO No. 5-00-717;

   e. ACL Complaint No. R5-2004-0534 in the amount of $493,500 for failure to comply with certain requirements set forth in TSO No. R5-2002-0014-R01;

   f. ACL and Penalty Order No. R5-2007-0138, the Stipulation for Entry of Administrative Civil Liability and Penalty Order (Stipulated Order); and

   g. Cease and Desist Order (CDO) No. R5-2007-0139.

8. On 17 November 2000 the Executive Officer issued CAO No. 5-00-717, which required the Discharger to prepare technical reports and construct wastewater treatment system improvements to comply with WDRs Order No. 97-037 by 1 November 2001. The Discharger did not comply with the CAO and, therefore, the Central Valley Water Board adopted TSO No. R5-2002-0014 on 25 January 2002. The TSO authorized an interim increase in the flow limits and increased effluent limits for fixed dissolved solids (FDS) from April 2002 through 6 September 2002. Among other requirements, the TSO required control of nuisance odors; installation of groundwater monitoring wells; an evaluation of the domestic wastewater disposal system; construction of process wastewater treatment improvements; and expanded cropping of the wastewater land application areas.

9. On 9 April 2002, the Executive Officer issued ACL Complaint No. R5-2002-0502 in the amount of $150,000, which addressed civil liabilities incurred by the Discharger for failure to comply with CAO No. 5-00-717 from 17 November 2000 through 25 January 2002. The Discharger paid the liability in full.

10. On 6 June 2002, the Central Valley Water Board revised the terms of the TSO by adopting TSO No. R5-2002-0014-R01. The revised TSO authorized another flow increase and an additional month to complete construction of an 84-million gallon wastewater treatment/storage reservoir. On the same day, the Central Valley Water Board issued WDRs Order No. R5-2002-0148 and CAO Order No. R5-2002-0149 to address continuing violations of the WDRs.

WDRs Order No. R5-2002-0148 allowed discharge to the LAAs of up to 800,000 gpd and required the Discharger to submit the following technical reports:

a. A work plan for additional characterization of groundwater;

b. Proposed storm water bypass criteria for the LAAs;

c. A Salinity Source Reduction Plan;

d. An Operations and Maintenance Plan for the wastewater treatment systems and the LAAs;

e. A Waste Assimilative Capacity Report for the LAAs;

f. A Solid Waste Management Plan;

g. A Monitoring Well and Lysimeter Installation Report;

h. A Domestic Wastewater Septic System Improvement Installation Report; and

i. A Background Groundwater Quality and Percolate Quality Report.

CAO No. R5-2002-0149 set forth a schedule for compliance with increasingly stringent effluent salinity limitations as tabulated below.

	Effluent Limitation and Compliance Date		
Constituent	**6 September 2002**	**6 September 2003**	**6 September 2004**
TDS (mg/L)	4,700	3,373	2,047
Sodium (mg/L)	739	668	597

11. On 6 August 2004, the Executive Officer issued ACL Complaint No. R5-2004-0534 in the amount of $493,500 for failure to comply with certain requirements set forth in TSO No. R5-2002-0014-R01 from 25 January 2002 through 31 May 2004. Subsequent to the issuance of the ACL Complaint, the Discharger and the Executive Officer agreed to settle the matter without a formal hearing. The Central Valley Water Board approved ACL and Penalty Order No. R5-2007-0138, the Stipulation for Entry of Administrative Civil Liability and Penalty Order (Stipulated Order) on 26 October 2007. The Stipulated Order required that the Discharger do the following:

    a. Pay the $493,500 administrative civil liability in four installments between 15 April 2008 and 15 October 2009.

    b. Submit a Site Closure and Maintenance Report by 31 December 2007. The report was to include a short-term maintenance plan for the site to assure that no discharges of waste from the site occur via surface water drainages after the Discharger ceases operations; a plan for the complete closure of the site; a detailed plan for post-closure maintenance and monitoring of the site; and a cost estimate for completing corrective action for all known or reasonably foreseeable releases from the site that pose a threat to water quality. This closure plan is separate from the closure requirements for the Class II surface impoundments regulated under WDRs Order No. R5-2005-0024.

c. Submit a Financial Assurances Report to the Executive Officer within 60 days of approval of the Site Closure and Maintenance Report. This report was to describe proposed mechanisms and a time schedule to obtain financial assurances to ensure that funds are available to implement the approved closure plan and a time schedule for obtaining financial assurances.

d. Within 60 days of approval of the Financial Assurances Report, provide proof that the Discharger has obtained financial assurances consistent with the approved Financial Assurances Report and in accordance with the approved time schedule in the Report.

The Discharger has paid the civil liability in full and timely submitted the required Site Closure and Maintenance Report. The proposed plan for site closure is discussed in later findings.

12. Cease and Desist Order No. R5-2007-0139 was adopted by the Central Valley Water Board on 26 October 2007 to provide interim effluent limits for TDS, FDS, and sodium. Based in part on facility and operational changes proposed by the Discharger, the CDO required the following:

a. Replacement of an unlined pond used as a pumping sump to deliver wastewater to the LAAs (the “million-gallon pond”) with an above-ground tank (the reservoir surge tank, or RST);

b. Characterization of soil contamination at the former million-gallon pond site;

c. A wastewater treatment facility capacity evaluation report;

d. An assessment of the LAAs’ capacity to assimilate the applied waste constituents without impacting groundwater quality;

e. A phased supplemental groundwater investigation to determine background groundwater quality and the extent of groundwater degradation;

f. A storm water and tailwater capacity evaluation report;

g. A storm water and tailwater system improvement report;

h. An annual wet season preparation report;

i. An enhanced evaporation pilot scale study evaluation report; and

j. A Report of Waste Discharge.

The Discharger submitted all of the required reports.

PROCESSING OPERATIONS AND WASTE CHARACTER

13. The facility processes and cans olives year round and generates wastewater with high organic strength and high salinity. Processing generally consists of receiving olives, storing them in acetic acid solution, curing in sodium hydroxide (lye), pitting, and canning in a brine solution. Attachment B, which is attached hereto and made part of this Order by reference, is a simplified process schematic.

14. Fresh olives are received at the facility during the harvest period (typically September through early November) each year. Approximately 80 percent of the olives are flumed into storage tanks that contain a solution of acetic acid, calcium chloride and sodium benzoate. The remainder is flumed directly to the processing plant. The stored olives are processed as needed from December through August.

15. The facility has 1,383 olive storage tanks ranging in size from 2,300 gallons to 9,702 gallons for a total of approximately 45,000 tons of storage capacity. Up to 8,000 tons of olives can be processed fresh during the harvest season, for a total harvest capacity of 53,000 tons.

16. The facility can process approximately 1,000 tons of olives per week for a total processing capacity of 52,000 tons per year. Over the past five years, an average of 31,000 tons of olives was processed each year.

17. The Discharger obtains its process water from the nearby California Aqueduct and has been monitoring the process water quality semiannually since December 2007. The character of the raw process water supply based on data presented in the RWD is summarized below.

Constituent	**Units**	**No. of Samples**	**Process Water Supply Analytical Result**		
			Minimum	**Maximum**	**Mean**
EC	umhos/cm	16 [1]	173	693	401
TDS	mg/L	16 [1]	104	390	229
Total alkalinity as $CaCO_3$	mg/L	16 [1]	58	90	71
Bicarbonate alkalinity as $CaCO_3$	mg/L	4 [2]	80	110	97
Hardness as $CaCO_3$	mg/L	16 [1]	52	127	88
Chloride	mg/L	16 [1]	13	120	62
Sodium	mg/L	16 [1]	14	79	41
Sulfate	mg/L	16 [1]	10	52	27
Iron	mg/L	15 [1]	<0.005	0.310	0.055 [3]

Constituent	Units	No. of Samples	Process Water Supply Analytical Result		
			Minimum	Maximum	Mean
Calcium	mg/L	16 [1]	11	24	17
Magnesium	mg/L	16 [1]	6	15	11

1 Includes data from 12 monitoring events completed by the Department of Water Resources at the Harvey Banks pumping plant in 2003 and 2004.

2 Includes data from four monitoring events completed by the Discharger in 2007 and 2008.

3 Calculated using one-half of the reporting limit for five non-detect results.

Based on these data, the process water supply exhibits low salinity and moderate hardness. Prior to use, the Discharger treats the raw water by polymer flocculation, clarification, granulated media filtration and chlorine disinfection. Water supplied to the boiler is also routed through an ion exchange water softening system that is regenerated with sodium chloride.

18. The olive brining process generates several liquid waste streams, some of which are discharged to the Class II surface impoundments for disposal. The rest are discharged to the land discharge system. The land discharge system includes the reservoir surge tank (RST), which is used to collect untreated wastewater; an 84-million gallon wastewater treatment and storage reservoir; and the LAAs themselves. All wastewater discharged to the LAAs receives treatment in the wastewater treatment/storage reservoir prior to discharge. The individual liquid waste streams are listed below with their corresponding discharge locations, and are depicted schematically on Attachment B. When capacity is available in the Class II surface impoundments, some waste streams normally discharged to the land discharge system are discharged to the impoundments to minimize the flow and salt loadings on the LAAs.

Waste Stream Number [1]	Description	Discharge Location
1	Filter backwash	Land discharge system [2]
2	Pre-rinse water	Land discharge system [2]
3	Neutralization brine	Class II surface impoundments
4	Neutralization rinse water	Land discharge system [2]
5	Ferrous gluconate	Land discharge system [2]
6	First ferrous gluconate rinse	Land discharge system [2]
7	Second ferrous gluconate rinse	Land discharge system [2]

Waste Stream Number [1]	Description	Discharge Location
8	Transport water	Land discharge system [2]
9	Pitter start tank water	Land discharge system [2]
10	Accumulation tank	Land discharge system [2]
11	Floatation brine	Class II surface impoundments
12	Cooker cooling water	Land discharge system [2]
13	Boiler blowdown	Class II surface impoundments
14	Canning floor drains	Land discharge system [2]
--	Sanitation	Land discharge system [2]
--	Water softener regeneration brine	Class II surface impoundments
--	Flume water [3]	Land discharge system [2]

[1] Corresponds to liquid waste stream numbers on the process schematic (Attachment B).

[2] Waste streams discharged to the land discharge system receive treatment prior to discharge to the LAAs.

[3] Flume water is only generated during the harvest season (September through early November).

The olive storage and processing tanks are outdoors in unroofed areas. Secondary containment berms are used to capture process spills and precipitation that falls on the containment areas, which have a total area of approximately 307,000 square feet (7 acres). Water that collects in the containment areas is directed via drains to sumps equipped with electrical conductivity meters. If the EC is less than 4,800 umhos/cm, the water is pumped to the wastewater treatment/storage reservoir via the RST. Otherwise, it is pumped to the Class II surface impoundments.

19. Wastewater flow rates are variable from month to month depending on production. The following table summarizes average daily flows to the Wastewater treatment/storage reservoir from 2003 through 2008. Total annual flows to the wastewater treatment/storage reservoir ranged from 100 million gallons (MG) per year to 217 MG per year from 2000 through 2008. These flows account for both process wastewater and low salinity storm water collected in the outdoor processing areas.

Month	2003-2008 Average Daily Wastewater Flow (gpd)		
	Minimum	Maximum	Mean
January	175,922	402,060	268,547
February	251,757	491,704	324,654

Month	2003-2008 Average Daily Wastewater Flow (gpd)		
	Minimum	Maximum	Mean
March	267,750	511,593	317,374
April	89,999	577,919	327,372
May	258,318	656,809	347,786
June	314,494	761,128	406,607
July	3,207	792,903	316,017
August	0	708,722	352,497
September	27,778	742,870	376,834
October	423,627	704,632	490,224
November	249,971	540,849	341,931
December	80,028	401,522	167,895

20. Based on eight sampling events during one week in September 2008, the chemical character and relative flow contribution of the individual process waste streams is summarized below. These waste streams are discharged as individual batches to the RST. Five batches are processed each week, though the size of the batches may vary.

Waste Stream	Percentage of Total Influent Flow [1]	Mean of Influent Analytical Results				
		BOD[2] (mg/L)	FDS (mg/L)	Sodium (mg/L)	Chloride (mg/L)	Bicarbonate (mg/L)
Filter backwash	4	35	208	35	51	62
Pre-rinse water	7	3,903	1,046	93	330	0
Neutralization rinse	7	5,450	5,180	1,477	349	1,090
Ferrous gluconate	7	2,045	1,824	532	234	467
1st Ferrous rinse	7	1,171	899	306	150	391
2nd Ferrous rinse	7	845	526	206	136	234
Transport water	11	294	285	110	118	141
Start tank water	-- [3]	410	500	208	121	250
Accumulation tank	14	3,206	728	270	117	300
Cooker cooling water	12	42	258	95	129	69
Canning floor drains [4]	14	--	--	--	--	--

Waste Stream	Percentage of Total Influent Flow [1]	Mean of Influent Analytical Results				
		BOD[2] (mg/L)	FDS (mg/L)	Sodium (mg/L)	Chloride (mg/L)	Bicarbonate (mg/L)
Sanitation [4]	7	--	--	--	--	--
Flume water [4, 5]	--	--	--	--	--	--

1 The estimated total flow excludes flume water, which is only generated during the harvest season.

2 Biochemical oxygen demand.

3 Start tank water flow rate was measured in combination with the transport water flow rate. The two streams together total approximately 11 percent of the total flow to the RST.

4 Waste stream character not provided in RWD.

5 Flume water is only generated during the harvest season

21. The wastewater collection system consists of floor drains within the processing plant, various collection tanks and sumps, a solids separator, the 200,000-gallon RST and the 84-million gallon, 16-acre, aerated wastewater treatment/storage reservoir. The reservoir was constructed in a natural drainage swale with an earthen dam. The reservoir is shown on Attachment C, which is attached hereto and made part of the Order by reference. Because of the reservoir's volume and geometry, operation and maintenance of the dam is regulated by the State Department of Water Resources' Division of Safety of Dams (DSOD).

22. Wastewater treatment consists of carbon dioxide or organic acid neutralization of alkaline rinse waters, solids removal by static 60-mil parabolic screens, and aeration. The wastewater treatment/storage reservoir is equipped with eleven aerators. Lye solutions are reclaimed through the addition of sodium hydroxide in above-ground stainless steel storage tanks. Spent lye solutions are periodically discharged to the Class II surface impoundments.

23. Wastewater that is discharged to the Wastewater treatment/storage reservoir is characterized by high organic content and elevated salinity [1]. Based on laboratory analysis of weekly grab samples obtained from the RST in 2008, the character of the raw

---

1 Total dissolved solids (TDS), fixed dissolved solids (FDS) and electrical conductivity (EC) are all valid salinity indicator constituents. However, TDS is not the best salinity indicator when the degradable organic content of the waste is high because dissolved organic matter contributes to the TDS value and overstates the actual salinity. In such cases, FDS is the preferred salinity indicator because the test method does not measure most dissolved organic constituents. EC is often still a good salinity indicator when dissolved organic matter is present in the waste, but some dissolved organic compounds can contribute to EC. Because the Discharger's wastewater contains high concentrations of dissolved organic matter, this Order uses FDS data to the maximum practical extent to characterize and regulate the wastewater discharge.

wastewater discharged into the aerated wastewater treatment/storage reservoir is summarized below.

Constituent	Units	Raw Wastewater Results for 2008 (Discharge from the RST)		
		Minimum	Maximum	Mean
BOD	mg/L	647	6,500	3,181
TDS	mg/L	1,140	4,320	2,838
FDS	mg/L	680	2,380	1,517
Total Kjeldahl Nitrogen	mg/L	5	128	40
Nitrate Nitrogen	mg/L	<0.1	3.3	0.7
Total Nitrogen [1]	mg/L	7	128	41
Chloride	mg/L	140	510	252
Sodium	mg/L	89	777	462

[1] Estimated as the sum of Total Kjeldahl nitrogen (TKN) and nitrate nitrogen.

24. The character of treated effluent discharged from the wastewater treatment/storage reservoirs to the LAAs is summarized below based on laboratory analysis of weekly grab samples obtained from the wastewater treatment/storage reservoir in 2008.

Constituent	Units	Treated Effluent Results for 2008 (Discharged to the LAAs)		
		Minimum	Maximum	Mean
BOD	mg/L	81	2,100	598
TDS	mg/L	2,240	4,790	2,986
FDS	mg/L	1,830	2,930	2,316
Total Kjeldahl Nitrogen	mg/L	3	235	47
Nitrate Nitrogen	mg/L	<0.1	1.0	0.18
Total Nitrogen [1]	mg/L	3	235	47
Chloride	mg/L	33	500	355
Sodium	mg/L	417	3,830	816

[1] Estimated as the sum of TKN and nitrate nitrogen.

These data indicate that the treatment system currently achieves approximately 81 percent BOD reduction. The approximately 53 percent increase in salinity between the raw wastewater and treated effluent (measured as FDS) is attributable to evapoconcentration within the wastewater treatment/storage reservoir.

25. The RWD requested that the wastewater treatment/storage reservoir operational limits imposed by the current WDRs and CDO be relaxed as follows:

    a. Reduce the minimum dissolved oxygen (DO) concentration from 2.0 to 1.0 mg/L;

    b. Remove the maximum dissolved sulfide concentration of 0.1 mg/L; and

    c. Remove the pH limit of 7.5 to 8.5.

    The current reservoir operational limits were imposed to control nuisance odors. However, almost seven years of daily monitoring data indicate no correlation between the concentration of dissolved sulfide in the wastewater treatment/storage reservoir and nuisance odors. Additionally, dissolved sulfide has only occasionally been detected since the reservoir aerators were installed in 2003.

    The Discharger has consistently complied with the current DO limit since November 2007. However, between 2003 and November 2007, DO concentrations in the treatment/storage reservoir ranged from 0 to 8.0 mg/L and typically were greater than 2.0 mg/L only for brief periods. During that time, there were no odor complaints. Comparison of historical effluent BOD concentrations and the corresponding reservoir DO concentrations indicate that BOD removal might not be significantly reduced by decreasing the reservoir DO limit to 1.0 mg/L.

    Between June 2003 and December 2008, the pH in the treatment/storage reservoir has typically ranged between 6.5 and 9.0. The lowest recorded pH value was 5.5 and the highest was 10.9. The record does not indicate a correlation between pH and odors.

    Based on the foregoing, it is appropriate to remove the dissolved sulfide limit and revise the operational limits for DO and pH to the limits that are usually imposed for food processing discharges.

LAND APPLICATION SYSTEM

26. The entire facility consists of 280 acres, of which approximately 80 acres are used for the processing plant. Of the remaining 200 acres, approximately 171 acres are currently used for land application of process wastewater. The remaining 40 acres consist of service roads, environmentally sensitive areas, and approximately 11 acres left fallow due to regulatory constraints. The LAAs are shown on Attachment C and the area of each LAA is provided below.

Land Application Area	Useable Acreage	First Year of Use	Slope
18 North	18.8	2001	Fairly level
Checks	11	2001 [1]	Level terraces
Evaporation South	2.2	2000	Moderate
Evaporation West	3.1	2000	Fairly level
Field 55 (East and West)	21.5	1992	Moderate to steep
Field 95 (1st, 2nd, and 3rd Swales)	102	1995	Moderate to steep
Park West	2.2	2000	Moderate to slight
Pasture	3.2	2000	Moderate
South Ridge (East and West)	13.7	2001	Moderate
Spur North	4.2	2000	Fairly level

[1] This LAA was used only in 2001 and 2002 as discussed below.

The “Checks” LAA was used in only 2001 and 2002, when it functioned as a shallow percolation pond. Because this use caused nuisance odors, WDRs Order No. R5-2002-0148 prohibited further use of this area unless the Discharger demonstrated that off-site odor problems would be prevented. Since then, the Discharger has successfully used wastewater for irrigating the neighboring LAAs without further odor complaints. Therefore, there is no longer a reason to prohibit discharge to the Checks LAA in compliance with the conditions of this Order.

27. Wastewater is applied to the LAAs by sprinkler irrigation. A natural surface water drainage exists in the land application areas (see Attachment C). The Discharger constructed ditches to prevent tailwater from draining into the surface water drainage. Irrigation tailwater is pumped to the wastewater treatment/storage reservoir for recycling. Likewise, all storm water runoff from the LAAs drains to the wastewater treatment/storage reservoir.

28. Attempts to grow fodder crops such as Sudan grass and winter barley were unsuccessful due to the salinity of the waste. In 2004, the Discharger planted a 20-acre experimental plot of NyPa Forage™, a patented clone of *Distichlis spicata*, which is commonly known as salt grass.

29. According to the producer, NyPa Forage™ grows from rhizomes and produces well in waterlogged saline environments, such as salt marshes, where the rooting depth can

extend as deep as 36 inches. In unsaturated conditions, the roots may extend as little as two inches below the rhizomes [2]. The fastest spread reportedly occurs in sandy soils. However, the Discharger states that site-specific observations suggest that NyPa Forage™ grows quickly in the saturated heavy clay soils found at the site. NyPa species are halophytes (salt lovers) and take up salt with water through the roots. Some of the salt is stored in the plant tissue and some is exuded by the plants' leaves. The salt crystals can be dislodged by subsequent irrigation and precipitation events.

30. According to the United States Department of Agriculture Natural Resources Conservation Service (NRCS), *Distichlis spicata* is a slow-growing perennial that actively grows in the spring through autumn months, and is dormant during the winter. It is well-adapted to fine-grained soils, is moderately drought tolerant, requires moderate amounts of fertilizer, and will tolerate a minimum soil pH of 6.4.

31. NyPa Forage™ can be used as feed for ruminants, and the Discharger currently sells the harvested crop for that purpose. The Discharger states that yields can reach 11 tons per acre with balanced fertilization.

32. In the last two years, the Discharger has expanded the NyPa Forage™ cultivation to all of the LAAs. The Discharger states that tail water return and storm water runoff have been greatly reduced on established NyPa fields (especially on the steeper LAAs), and that erosion has been eliminated on fully established fields. Based on the RWD and a site inspection on 16 June 2009, estimated NyPa Forage™ canopy coverage as of June 2009 is summarized below. Another canopy evaluation was conducted in December 2009, as discussed below.

Land Application Area	**Total Area (Acres)**	**NyPa Coverage (Percent of Optimal)**
18 North	18.8	70%
Checks	11	0%
Evaporation South	2.2	Not estimated
Evaporation West	3.1	65%
Field 55 East	8	40%
Field 55 West	13.5	70%
Field 95 Acres	102	Less than 40%
Park West	2.2	Not estimated

2 Based on Conservation Plant Characteristics, USDA Natural Resources Conservation Service, plants database for *Distichlis spicata* (http://plants.usda.gov/java/charProfile?symbol=DISP).

Land Application Area	Total Area (Acres)	NyPa Coverage (Percent of Optimal)
Pasture	3.2	65%
South Ridge East	7.3	Less than 80%
South Ridge West	6.4	75%
Spur North	4.2	60%

[1] The western half of this LAA (known as the second and third swale areas has less complete coverage that the eastern half (known as the first swale).

33. Based on laboratory testing of NyPa forage harvested from the Discharger's LAAs in 2008, the total salt content on a dry weight basis was 10.5 to 12.5%, and the sodium and chloride content was 6.2 to 6.5% on a dry weight basis. The Discharger estimates that a fully established NyPa forage crop on 160 acres of LAAs may remove up to 110 tons of salt per year, including 57 tons of sodium and chloride. However, 2006 crop analysis data collected at harvest indicate that approximately 40 percent of the salt taken up by the crop is on the outside of the plant, and is therefore vulnerable to being washed back onto the LAA soil by irrigation and precipitation. Additionally, the Discharger acknowledges that it will be difficult to achieve 100% crop coverage given the crop needs and site-specific conditions. Based on a December 2009 re-evaluation of NyPa coverage, the Discharger estimates that the current canopy cover is 51 percent as a site-wide average. Based on the oldest plantings of NyPa at the site on the 18 North and South Ridge LAAs, the Discharger believes that canopy cover of 80% or more can be achieved.

34. Since adoption of the current WDRs, the Discharger has implemented several process changes, equipment modifications, and modifications to the process wastewater collection system to minimize the volume and reduce the salinity of the wastewater discharged to the LAAs. These changes include:

    a. Converting to a closed loop fluming system;

    b. Reclaiming and recycling lye solutions and other process streams;

    c. Using carbon dioxide to neutralize residual lye in the olives instead of rinsing several times in fresh water;

    d. Reducing the concentration of acetic acid used for olive storage solution;

    e. Changing the floatation brine solution less frequently; and

    f. Housekeeping changes to reduce water use and capture high salinity spillage for discharge to the Class II surface impoundments.

    Based on daily flow monitoring and weekly FDS monitoring data provided in the RWD, wastewater volumes and the salinity mass discharged from the processing plant to the treatment/storage reservoir from 2004 through 2009 are summarized below.

Year	Monthly Average FDS Concentration (mg/L)		Range of Total Monthly Flows (MG)	Range of Monthly FDS Mass (tons)	Total Annual Flow (MG)	Total Annual FDS Mass (tons)
	Range	Mean				
2004	1,500 to 2,600	2,100	2.8 to 17.1	18 to 176	147	1,305
2005	1,300 to 2,700	1,900	2.5 to 22.3	14 to 206	167	1,365
2006	1,400 to 2,500	2,000	4.2 to 18.3	21 to 194	141	1,202
2007 [1]	1,700 to 2,700	2,000	0 to 19.9	0 to 167	91	754
2008	1,300 to 1,900	1,500	7.6 to 13.5	50 to 101	139	879
2009 [2, 3]	900 to 1,700	1,400	0.25 to 11.4	1 to 81	81	493

1 The processing plant did not operate for approximately 2½ months beginning in early July and ending in mid-September.

2 The processing plant did not operate for approximately 30 days total from July through September.

3 Data for December 2009 were not available. Tabulated values are estimated based on the assumption that flows and FDS concentrations for December 2009 are the same as November 2009.

As indicated by these data, the average FDS concentration of the raw wastewater has decreased significantly in the last two years, as has the maximum monthly FDS mass. Excluding the data from 2007 and 2009 (when the plant was closed for significant periods), the total annual FDS mass has also decreased since 2004 through 2006 despite relatively constant total annual wastewater volumes.

35. The Discharger submitted a water balance to show the capacity of the LAA treatment, storage and disposal system. The water balance model was based on local historical climate data; site topography; wastewater treatment/storage reservoir geometry; and reasonable estimates of NyPa crop coverage, crop evapotranspiration, and runoff coefficients. Based on the current site-wide average crop coverage of 51 percent, the land discharge system's hydraulic capacity during the 100-year 365-day precipitation event is summarized in the following table.

Site Condition/Capacity	Value
Crop Coverage	51%
Runoff Coefficient	40%

Site Condition/Capacity	Value
Wastewater Flow Capacity [1]:	
Total Annual Flow	180 MG
Annual Average Flow	493,000 gpd
Peak Month Average Flow	716,000 gpd

1 Measured as the combined flow of wastewater and storm water from the RST to the wastewater treatment/storage reservoir.

It is appropriate to limit flows to the current capacity. However, if the Discharger is successfully sustains crop coverage that is significantly greater than current conditions, the flow limits may be increased, subject to further environmental review under the California Environmental Quality Act (if needed) and revision of this Order.

The Discharger has the ability to cease operations as needed to control wastewater flows, and has typically closed the processing plant several days per year for the last several years. Although the water balance model is reasonable and even conservative in some aspects, it did not account for the accumulation of sludge in the wastewater treatment/storage reservoir, and the RWD did not discuss periodic sludge removal as a maintenance practice. Because of the high strength of the waste, sludge accumulation in the wastewater treatment/storage reservoir could potentially impact storage capacity significantly in a relatively short time frame. Therefore, this order requires that the Discharger regularly monitor the effects of sludge accumulation on storage capacity and provide a detailed plan for periodic sludge removal and disposal.

OTHER WASTE STREAMS

36. Residual solids include olive pits, stems, waste olives, and screened solids. The olive pits and stems are sold as biomass and burned at cogeneration plants or pulverized and incorporated into compost. Waste olives are transported offsite for animal feed or offsite land disposal. The Discharger is developing an onsite process to burn the pits to operate a stream generation system which is discussed further below. Residuals from this process will not be discharged onsite.

37. Approximately 350 employees work at the facility. Domestic wastewater is discharged to an on-site septic system regulated by the San Joaquin Count Environmental Health Department. The septic system, located in the former LAA called “Evaporation North”, was expanded in 2003. Process wastewater is no longer applied to that area and domestic wastewater is not commingled with process wastewater.

SITE SPECIFIC CONDITIONS

38. The site is located on the eastern slope of the Diablo Range. The City of Tracy is approximately five miles northeast of the site. The facility is sited on an alluvial fan that generally slopes to the northeast, and surface elevations at the site range from 540 feet above mean sea level (MSL) to 240 feet MSL. Slopes range from approximately 20 percent in the southern part of the site to nearly flat in the northern portions of the site.

39. The average annual precipitation in the area is 9.90 inches and the 100-year total annual precipitation is 21.32 inches. The reference evapotranspiration rate (ET_o) in the area is approximately 53 inches per year.

40. Local land use is primarily open space, with some neighboring industrial, residential, and agricultural operations. The facility and LAAs are outside the 100-year flood zone.

41. Site soils are predominantly mapped as Calla-Carbona complex and Carbona clay loam by the Natural Resource Conservation Service (NRCS). Carbona complex and Cogna fine sandy loam are also found. Calla-Carbona complex is comprised of 45 percent Calla clay loam and 40 percent Carbona clay loam. The Calla soil is described as very deep and well drained on strongly sloping to moderately steep terrain. The Carbona clay loam is described as very deep, well-drained soils on gently to moderately sloping terrain. Carbona complex soils are described as moderately steep and steep soils that are comprised of 45 percent Carbona clay loam and 40 percent Carbona clay loam containing a sandstone substratum at approximately 57 inches. Both of these soils are deep and well drained. Cogna fine sandy loam is described as very deep, well drained, nearly level soil on alluvial fans.

42. The Discharger has been monitoring concentrations of waste constituents in shallow LAA soils annually since 2002. A total of 18 on-site sampling locations (sampling locations 1 through 10 and 12 through 19) and five background sampling locations (sampling locations A, B, C, 11, and 20) have been monitored at depth intervals ranging from the upper six inches of soil to a one-foot interval five to six feet below the ground surface (bgs). These locations are shown on Attachment D, which is attached hereto and made part of this Order by reference.

    As noted above, soil sampling locations A, B, C, 11, and 20 are located outside of the LAAs and are considered background soil sampling locations. The following table summarizes general soil characteristics and historical electrical conductivity monitoring data for the background locations.

Sampling Location by NRCS Map Unit	NRCS Characterization		Mean of Background Soil Electrical Conductivity Results (umhos/cm) by Sampling Interval (inches bgs)		
	Slope (%)	Salinity (umhos/cm)	0 to 6 inches	27 to 39 inches	60 to 72 inches
123 - Carbona Clay Loam					
A [1]	10	<1,000 to 2,000	9,200 [4]	2,800	5,200
B [1]	10		3,000	1,800	1,900
11 [2]	7		4,500	5,600	4,200
114 - Calla Carbona Complex					
C [1]	10	<700 to 1,000	1,400	1,100	1,300
20[3]	7		700	1,900	2,000

1 Based on three annual samples (2006 through 2008).

2 Based on seven annual samples (2002 through 2008).

3 Based on five annual samples (2004 through 2008).

4 Mean result is skewed upward significantly by a single high value in September 2006.

The background soil EC results to date vary significantly with location, depth, and time. The spatial and temporal variations in background soil EC are not readily explained by climate, topography, or soil type because all of the background locations experience the same weather, are on moderate slopes of 7 to 10 percent; are outside of natural drainage channels; and the soils are reportedly all predominantly clay. Therefore, it may not be practical to establish a site-specific value for background soil EC.

43. Electrical conductivity is a good indicator of the impact of the discharge on LAA soils because the predominant waste constituents of concern are salinity constituents. The following table provides ranges of soil EC results to date for the 18 soil sampling locations that are within the LAAs (by depth interval).

Sampling Location by NRCS Map Unit	Range of LAA Soil Electrical Conductivity Results (umhos/cm) by Sampling Interval (inches bgs)		
	0 to 6 inches	27 to 39 inches	60 to 72 inches
123 – Carbona Clay Loam			
10	4,100 to 26,100	2,200 to 24,900	1,500 to 5,400
14	16,000 to 37,700	3,300 to 8,400	1,600 to 4,000
17	12,700 to 32,100	3,600 to 7,500	1,900 to 8,500

Sampling Location by NRCS Map Unit	**Range of LAA Soil Electrical Conductivity Results (umhos/cm) by Sampling Interval (inches bgs)**		
	0 to 6 inches	**27 to 39 inches**	**60 to 72 inches**
114 – Calla Carbona Complex			
1	7,900 to 43,400	1,900 to 6,500	1,500 to 3,400
3	4,100 to 63,400	2,500 to 7,600	1,800 to 17,300
4	4,400 to 38,100	1,900 to 4,000	1,200 to 4,400
5	3,000 to 40,200	1,900 to 9,600	1,600 to 7,000
6	1,300 to 38,100	3,800 to 6,500	2,100 to 7,500
7	4,600 to 106,000	2,500 to 16,300	1,600 to 6,300
8	8,900 to 69,800	2,700 to 11,400	1,500 to 7,700
9	2,400 to 22,300	1,600 to 10,500	2,100 to 4,200
12	2,200 to 35,400	2,100 to 6,200	1,900 to 12,500
13	8,500 to 18,200	2,100 to 3,600	2,000 to 3,500
15	5,300 to 26,700	2,900 to 23,300	2,100 to 3000
16	3,100 to 8,500	1,700 to 6,300	1,700 to 2,900
18	5,500 to 46,000	1,900 to 5,900	1,800 to 5,100
19	3,400 to 8,300	2,300 to 6,800	2,800 to 10,700
126 – Carbona Complex			
2	5,800 to 56,700	2,000 to 6,300	1,700 to 4,200

As shown by the tabulated data, the soil EC results for the LAA samples are also highly variable. Although some temporal trends seem to be present at some of the LAA sampling locations, the data do not conclusively show site-wide increases over time for any of the depth intervals monitored. However, there are significant data gaps in the depth intervals sampled. Specifically, with the exception of one monitoring event in 2007, there are no data for the interval from 7 to 26 inches bgs or from 40 to 60 inches. Additionally, the RWD did not correlate the soil monitoring data with LAA-specific information such as slope, soil type, use history, and historical salinity loadings. Such correlations may help to explain the variability within the data set. However, many natural soils have considerable salinity variability over short distances even when no wastes have been applied to the soils.

44. Based on the spatial and temporal variability of the background soil monitoring data, it may not be possible to use the LAA soil monitoring data to make conclusions about salinity accumulation at each discrete sampling location. However, it may be possible to assess temporal trends by comparing the aggregate LAA data to the aggregate

background data for each sampling interval. The following table provides some EC statistics for the each monitored soil interval based on the aggregated values for the background sampling locations and sampling locations within the LAAs.

Statistic	Soil Electrical Conductivity Statistic Value by Sampling Interval (inches bgs)					
	0 to 6 inches		27 to 39 inches		60 to 72 inches	
	Background	LAAs	Background	LAAs	Background	LAAs
Minimum	600	1,300	600	1,600	550	1,200
Maximum	25,400	106,000	11,900	24,900	8,500	17,300
Mean	3,600	18,600	3,100	4,500	3,100	3,500
90^{th} Percentile	7,600	39,000	8,200	7,900	6,200	6,500

Based on these statistics:

a. The background EC is similar within each of the three depth intervals. This may indicate that the soil salinity does not naturally vary significantly with depth within the upper six feet of soil.

b. The upper six inches of LAA soil shows significantly higher EC than the background soil on a site-wide basis; and

c. The 27- to 39-inch and 60- to 72-inch intervals show some signs of salinity impacts compared to background. These impacts may be localized.

45. As noted above, electrical conductivity is a good indicator of the impact of the discharge on LAA soils because the predominant inorganic waste constituents are sodium and chloride. However, chloride is conservative (i.e., it does not degrade or readily react with soil minerals) and sodium is not. Therefore, other important salinity indicators for this site are cation exchange capacity (CEC), sodium absorption ratio (SAR), and exchangeable sodium percentage (ESP). CEC is a measure of a soil's ability to bind and exchange positively charged ions in soil pore water, many of which are plant nutrients. Soils rich in organic mater and clay typically have a high CEC, whereas sands and gravels typically have very low CEC and do not sustain plant life well. SAR can be used to assess the adverse effects of sodium on a particular soil. It is calculated from concentrations of soil sodium, magnesium and calcium. When the SAR exceeds 12 to 15, soil tilth and permeability are reduced, and plants are less able to absorb soil moisture. Sodic soils are those that have a high ESP, which is a measure of the portion of the cation exchange capacity that is occupied by sodium. Sodic soils are poorly drained and may impact plant growth by sodium toxicity, nutrient deficiencies, and/or high pH. If the ESP is greater than

15%, the soil is considered sodic. Sodicity can be reduced be adding calcium carbonate (lime) or calcium sulfate (gypsum) to the soil. However, this practice requires the addition of water to leach the displaced sodium below the crop root zone, which could result in groundwater degradation unless deep percolation is prevented through controlled operations.

Parameter	Mean of Soil Analytical Results for Other Salinity Indicators by Sampling Interval (inches bgs)					
	0 to 6 inches		27 to 39 inches		60 to 72 inches	
	Background	LAAs	Background	LAAs	Background	LAAs
CEC (meq/ 100g)	34	31	29	30	26	28
SAR	15	87	12	17	15	16
ESP (%)	11	47	13	20	16	17
Sodium (meq/L)	28	175	22	36	24	26
Chloride (meq/L)	15	91	9	28	13	21
Bicarbonate (meq/L)	7	140	5	7	5	4
Sulfate (meq/L)	1	19	9	8	4	9

These statistics indicate that background soils have a relatively high CEC and marginal SAR and ESP. The upper six inches of LAA soils have become very sodic and soils in the 27- to 39-inch depth interval are also showing signs of increased sodicity. These data are consistent with the conclusions derived from the EC statistics.

GROUNDWATER CONDITIONS

46. The site lies in the eastern foothills of the Coast Range Mountains at the western edge of the alluvial deposits of the San Joaquin Valley. Deposits exposed in the area of the site include the Miocene to Pliocene Neroly Formation, the Pliocene to early Pleistocene Tertiary Pliocene sediments (Tps), and older and younger Quaternary alluvium. The Neroly Formation is a marine to non-marine blue to gray sandstone that is locally pebbly. The Neroly underlies the site with only minor exposures on the south side of the site. The top of the Neroly Formation is a blue clay, which is used as a marker bed for the transition from the Tps to the Neroly Formation, and the Tps conformably overlies the Neroly. The Tps is exposed across most of the site and consists of fine-grained sands and clayey silts that alternate with greenish gray clays and minor pebble conglomerates, marl, and sand of non-marine origin. Overlying the Tertiary sediments is older and younger Quaternary alluvium consisting of unconsolidated gravels, sands, silts, and clays. Older alluvium is surficially exposed in minor amounts in the northern portion of the site as terrace deposits. The younger alluvium occurs as thin surficial deposits in the central drainage

swale that bisects the site, with lesser amounts in tributary drainages. Sediments at the site are derived primarily from marine deposits of the Coast Ranges.

47. The Tertiary sediments are complexly folded and regionally dip 25 to 30 degrees to the northeast. Based on the blue clay at the top of the Neroly Formation, dips on the site appear to be approximately 20 degrees to the northeast on the south side of the central drainage swale and approximately 10 degrees to the northeast on the north side of the central drainage swale.

48. The Midway fault is located approximately 500 feet southwest of the southwestern corner of the property, and trends northwest/southeast. A lineament parallel to the Midway fault is mapped bisecting the site and a series of parallel faults are found further to the southwest. Structure southwest of the site is fault-blocked anticlines and synclines. The Midway fault is a normal fault that strikes to the northwest with the down-dropped block on the southwest side of the fault. The significance of the fault is that it may provide a conduit for to the vertical migration of fluids.

49. Fractures are present in outcrop of the Tps and Neroly at the site. These fractures are steeply dipping and occasionally filled with permeable clastic material. The permeable material may provide a conduit for to the vertical migration of fluids.

50. There is one onsite supply well that is used for the facility's domestic water supply. The well, Musco-1, is screened from 207 to 607 feet below ground surface with a 50-foot sanitary seal. Groundwater analytical data for five samples collected between 1982 and 1999 from this well are summarized below.

Constituent	Units	Range	Mean
TDS	mg/L	1,280 - 1,971	1,513
Sodium	mg/L	228 - 477	372
Chloride	mg/L	187 - 514	334
Nitrate nitrogen	mg/L	3.7 - 5.5	4.4

51. There is one offsite domestic supply well located approximately 200 feet east of the site. This well is screened from 235 to 335 feet below ground surface with a 50-foot sanitary seal. This well appears to be cross-gradient from the site. Groundwater analytical data for this well are summarized below based on quarterly monitoring from 2006 to 2009.

Constituent	Units	Range	Mean
TDS	mg/L	1,200 - 1,300	1,275
Sodium	mg/L	290 - 353	330
Chloride	mg/L	220 - 260	234
Nitrate nitrogen	mg/L	< 0.4 - < 0.1	--

52. There is an artesian well in the drainage northwest of and adjacent to the site. This well is of unknown construction, but reported to have been an exploratory petroleum well drilled in the early 1900s to a depth of 1,700 feet. The fact that this well is artesian (water level is above the ground surface) and is the location is 30 to 40 feet in elevation above the drainage (according to the topographic map for the area) indicates there are upward vertical gradients in the area. Water from the well is reportedly used for stock watering. Analytical data for a groundwater sample collected from this well in December of 2009 are summarized below.

Constituent	Units	Concentration
TDS	mg/L	2,490
Sodium	mg/L	693
Chloride	mg/L	485
Sulfate	mg/L	960
Nitrate nitrogen	mg/L	0.1

53. Known groundwater uses within one mile of the facility include stock watering and small domestic supply wells.

54. There are a total of 37 onsite groundwater monitoring wells, five offsite groundwater monitoring wells, and one offsite domestic supply well that are monitored quarterly. Eleven of the onsite monitoring wells are currently dry and are monitored for the presence of water.

55. Site investigations have identified three water-bearing zones on the site that are referred to as shallow, intermediate, and deep. These zones are discerned by differences in their water chemistry signatures (i.e., Stiff diagrams) and the static groundwater elevations.

56. The table below identifies the monitoring wells on site that monitor the shallow, intermediate, and deep groundwater zones. The table also provides well locations and whether each well is upgradient, cross-gradient, mid-gradient, or downgradient of the

waste disposal areas (i.e., the wastewater treatment/storage reservoir and the LAAs). These wells are depicted on Attachment E, which is attached hereto and made part of this Order by reference.

Well Designation	Shallow zone	"Intermediate" zone	Deep zone
Upgradient	MW-1; MW-14↓; MW-2C; MW-27	MW-23; MW-29 (2nd encountered groundwater	MW-2; MW-25
Cross-gradient	MW-24↓; MW-28;		
Mid-Gradient	MW-3↓; MW-5↓; MW-6; MW-13R↓; MW-15↓; MW-16; MW-9 (dry); MW-11 (dry); MW-19 (dry)	MW-6R	MW-3C; MW-4↓;; MW-8↓; MW-9R; MW-13C;
Downgradient	MW-17ţ; MW-10 (dry); SF-1; SF-3; MW-20 (dry); MW-21 (dry); W-2 (dry)	MW-10Rţ; MW-18ţ; MW-12↓; MW-22	MW-7; MW-26; SF-2

Notes: ţ designates transition zone (shallow to deep) wells.
↓ denotes persistent decline in water levels.

In general, the shallow groundwater zone (less than 60 feet bgs) is present in the southern portion of the Site, the intermediate zone (between 60 and 120 feet bgs) is present in the mid to northern portion of the Site, and the deep groundwater zone (greater than 120 feet bgs) is present in the northern portion of the Site.

57. Groundwater elevation data collected from monitoring wells completed at different depths and close to each other indicate downward to neutral vertical gradients at the depths and locations of those wells.

58. Groundwater flow in the deep zone is to the northwest with an approximate gradient of 0.038 feet/foot, groundwater flow in the intermediate zone is to the northeast with an approximate gradient of 0.038, and groundwater flow in the shallow zone is to the northeast with an approximate gradient of 0.036.

59. The Discharger has identified several different types of groundwater beneath the site that range in quality from connate to meteoric. Connate water is water that is trapped within

the interstices of a rock at the time of deposition and typically has a high TDS concentration, particularly for sedimentary rocks of marine origin. Meteoric water is water that has fallen as precipitation and recently infiltrated into the rock and typically has a low TDS concentration. Data collected by the Discharger indicate that water within the Neroly Formation (i.e., below the blue clay marker bed) is connate with a TDS range from 7,000 to 12,000 mg/L. Meteoric water is encountered in shallow wells along the central swale upstream of the 84 MG Reservoir and has a TDS range from 670 to 1,800 mg/L. Other types of water encountered at the facility have a quality between that of the connate and meteoric waters.

60. Groundwater at the site may be a mixture of connate and meteoric water. This is supported by monitoring wells MW-2C and MW-14. Well MW-2C is installed in the Tps, directly above the blue clay marker bed, and has the chemical signature of connate groundwater encountered below the blue clay. Well MW-14 is installed near well MW-2C and the central swale where meteoric groundwater occurs. Groundwater from well MW-14 has a geochemical signature that appears to be a mixture of connate and meteoric groundwaters. Connate waters may be the source of sulfate found in some onsite groundwater monitoring wells.

61. Groundwater encountered in monitoring wells MW-15, MW-16, MW-3, and MW-5 has been impacted by wastewater from the wastewater treatment/storage reservoir. This has been identified by an increase in bicarbonate concentrations that caused a change in Stiff diagram shapes after operation of the reservoir began in December 2002. The increase in bicarbonate was been accompanied by a decrease in chloride resulting in an increase in TDS concentrations except for MW-3 where TDS concentrations did not increase above the pre-reservoir concentrations. An increase in water levels in these wells can be correlated with filling of the wastewater treatment/storage reservoir, providing physical evidence of leakage.

62. Shortly after the wastewater treatment/storage reservoir was first used, water began to leak through the toe drain of the dam and down the central drainage swale. Leakage rates were measured at 1 to 2.5 gallons per minute. In June of 2005, the Discharger began capturing the toe drain leakage and returning it to the wastewater treatment/storage reservoir. Since 2008, bicarbonate and TDS concentrations have been decreasing. As of October 2009, TDS concentrations in wells MW-15 and 16 have recovered to concentrations present before filling of the wastewater treatment/storage reservoir. The TDS concentration detected in the groundwater sample collected during October 2009 from MW-5 (2,360 mg/L) is only slightly above pre-reservoir concentrations (2,200 mg/L) detected in April and June of 2002 and appears to be on a downward trend. Stiff diagram shapes are also changing, indicating reduced influence by wastewater. The increase in TDS downgradient of the wastewater treatment/storage reservoir appears to be a relic of previous operations of the wastewater treatment/storage reservoir and not reflective of current operations. Groundwater elevations in MW-3, MW-5, and MW-16 have been decreasing since 2007.

63. Geochemical analysis of groundwater collected from monitoring wells at the downgradient edge of the facility indicates that groundwater at the downgradient edge of the facility does not appear to have been significantly impacted by site activities.

64. The RWD presented four methods to estimate a range of ambient groundwater TDS concentrations considered representative of ambient water quality upgradient of the site. Four methods are presented as opposed to the single estimation approach because of the complexity of the groundwater flow regime beneath the site, and the inherent uncertainty provided by any single estimation method. The results presented in the RWD indicate the ambient TDS concentration is between 1,456 mg/l and 2,378 mg/l. The regional groundwater TDS concentration of 2,111 mg/L, based on data collected by the Department of Water Resources prior to operations at the site falls within this range.

65. Because of the hydrogeologic complexity of the site and the natural lateral and vertical variability of groundwater quality, evaluation of site impacts should be based on trend analysis of data collected from each well (i.e., intrawell analysis) instead of upgradient versus downgradient water quality.

66. Based upon the available water quality data and several different methods of estimating ambient conditions upgradient of the site, the Discharger believes that an ambient background concentration for TDS of 2,000 mg/L best represents the complex hydrogeology and groundwater quality of the Site.

FACILITY CLOSURE PLAN

67. As noted in Finding No. 11, a Site Closure and Maintenance Report was required pursuant to ACL and Penalty Order No. R5-2007-0138 by 31 December 2007, which the Discharger timely submitted. Stipulated Order No. R5-2007-0138 states, in part:

> "*Musco Family Olive Company and the Studley Company shall develop and maintain financial assurances according to the following schedule:*
>
> *a. By 31 December 2007, the Discharger shall submit a Site Closure and Maintenance Report to the Executive Officer for approval that contains:*
>
> *i. A detailed plan for the short-term maintenance of the site, including a*[n] *… annual cost estimate…*
>
> *ii. A detailed plan for the complete closure of the site, including a*[n]*…estimate of the cost…* [and] *at least two alternatives…* [one to be selected] *by the Executive Officer.*
>
> *iii. A detailed plan for post-closure maintenance and monitoring of the site, including a*[n] *estimate of the cost of maintaining the 84 million*

gallon reservoir to collect the site run-off for the design seasonal precipitation…, …and the cost of necessary monitoring.

iv. *A*[n] *estimate of the cost of initiating and completing corrective action for all known or reasonably foreseeable releases from the site that pose a threat to water quality.*"

The report included a brief feasibility study of LAA closure alternatives and identified two proposed closure objectives. The first objective is to effectively address accumulated salt loads within the upper 6 to 18 inches of LAA soil, and the second is to prevent the post-closure release of residual elevated salt concentrations to surface water drainages.

Nine conceptual alternatives were screened, and two were retained for detailed analysis. The first is the "Root Zone Salt Displacement Alternative", which is the Discharger's preferred alternative. This alternative would utilize infiltration galleries and low salinity water from the local irrigation district to move accumulated salt below the root zone. The wastewater treatment/storage reservoir would be drained and the effluent would be applied to the LAAs during the first year of the 3-year final closure project. No other closure activities for the reservoir were envisioned. The infiltration galleries would be designed and operated to displace residual salt to a target depth of 18 inches bgs using approximately 4 inches of water during each of three leaching events. Following these efforts, no further operation, maintenance and monitoring (OM&M) was envisioned, and the study assumed that no runoff controls would be required. Capital costs for the Root Zone Salt Displacement Alternative were estimated to be $500,000 each year for three years. There would be no OM&M cost, therefore the total cost would be approximately $1.5 million.

The second site closure alternative, which was selected for detailed analysis by the Executive Officer, would consist of excavation and offsite disposal of the upper six inches of LAA soil (approximately 130,000 cubic yards). Conceptually, the soil would be used as alternative daily cover at a Class II landfill. This alternative included runoff control and erosion control at the regraded LAAs. The wastewater treatment/storage reservoir would be drained and the effluent would be applied to the LAAs before the surface soil is removed. This alternative included three years of post-closure operation, maintenance, and monitoring, including storm water and groundwater monitoring; runoff controls; and regular inspection/repair. Capital costs for the Excavation and Offsite Disposal Alternative were estimated to be $6.8 million. The OM&M cost was estimated at $240,000 each year for three years. Therefore, the total cost would be approximately $7.5 million.

Although the Site Closure and Maintenance Report contains the required information, it did not adequately address site conditions. This is due in part to the fact that additional soil and groundwater data have been obtained since its submittal. The following concerns must be addressed before the Executive Officer approves the closure plan:

1. Sludge and salt left in the reservoir would pose an ongoing but unspecified threat to groundwater and surface water quality.
2. Accumulated sludge would be left in the reservoir. It would tend to dry out and rewetted by rain each subsequent year indefinitely, posing a significant threat of nuisance conditions.
3. The runoff diversion ditches around the reservoir, if not maintained, could fail. This could cause the dam to be overtopped, releasing sediment, sludge, and saline water to surface waters (possibly with accompanying flood damage). If the Division of Safety of Dams requires that the reservoir dam must be notched or removed upon decommissioning, any impounded residuals could be washed downstream during rainfall.
4. With regard to Root Zone Salt Displacement Alternative:
   a. The report did not include a conceptual design for the infiltration galleries. The capital cost estimate appears to be low given variable site conditions such as soil porosity and slope.
   b. This alternative is not proven, possibly cannot be proven, and may not be technically feasible (especially without long-term monitoring, which is not proposed). An unstated assumption is that it will be possible to reliably move the salt to 18 inches below ground surface and keep it there indefinitely even with wetter than normal years that are part of the natural climate pattern.
5. With regard to the Excavation and Offsite Disposal Alternative:
   a. The assumption that only six inches of soil would need to be removed does not fit well with the soil monitoring data, which show that some areas (not well-defined) exhibit salt impacts at depths of 12 to 26 inches. Closure may not require removal of all soils that have increased salinities from waste disposal, but the level of salts that can be left on site without and adverse impact on surface or groundwater quality has not been determined. Therefore the depth of soil that would need to be removed during site closure is unclear.
   b. An unstated assumption is that the existing soil salinity impacts will not move deeper during subsequent years of operation as more salt continues to be added.

There is not sufficient information at this time to select the final closure alternative, and a more detailed conceptual design is needed to refine the scope of work and closure cost estimates before the amount of required financial assurance can be determined. However, it is essential that the Discharger establish and begin contributing to a financial assurance account so that the Central Valley Water Board can be assured that adequate closure funds will be in place within ten years of the date of this Order. Therefore, this Order requires that the Discharger establish a financial assurance mechanism and begin making contributions beginning in 2010. This Order also requires that the Discharger address the concerns noted above, and provide a conceptual closure plan with a detailed cost estimate, and provide financial assurance for the closure option based on the detailed cost estimate contained in the approved conceptual closure plan.

BASIN PLAN, BENEFICIAL USES, AND REGULATORY CONSIDERATIONS

68. The *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, Fourth Edition* (hereafter Basin Plan) designates beneficial uses, establishes water quality objectives, contains implementation plans and policies for protecting waters of the basin, and incorporates by reference plans and policies adopted by the State Water Resources Control Board. Pursuant to Section 13263(a) of the California Water Code, waste discharge requirements must implement the Basin Plan.

69. Local surface water drainage is to the Sacramento San Joaquin Delta. The beneficial uses of the Sacramento San Joaquin Delta are municipal and domestic supply, irrigation, stock watering, industrial process and service supply, contact recreation, other non-contact recreation, warm and cold freshwater habitat, warm and cold migration, warm water spawning, and navigation. Surface water drainage from the site flows via an unnamed intermittent stream which typically terminates by infiltration within a low-lying area between the California Aqueduct and the recently developed Safeway distribution facility (see Attachment E). Surface water flow to the San Joaquin River would occur only during major flood events in the drainage area upstream of Musco.

70. The beneficial uses of underlying groundwater are domestic supply, agricultural supply, industrial service supply, and industrial process supply.

71. The Basin Plan establishes narrative water quality objectives for chemical constituents, tastes and odors, and toxicity in groundwater. It also sets forth numeric objectives for pH and total coliform organisms

72. The Basin Plan's narrative water quality objective for chemical constituents, at a minimum, requires waters designated as domestic or municipal supply to meet the maximum contaminant levels (MCLs) specified in Title 22. The Basin Plan recognizes that the Central Valley Water Board may apply limits more stringent than MCLs to ensure that waters do not contain chemical constituents in concentrations that adversely affect beneficial uses.

73. The narrative toxicity objective requires that groundwater be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life associated with designated beneficial uses. Quantifying a narrative water quality objective requires a site-specific evaluation of those constituents that have the potential to impact water quality and beneficial uses.

SPECIAL CONSIDERATIONS FOR FOOD PROCESSING WASTE

74. Excessive application of food processing wastewater to land application areas can create objectionable odors, soil conditions that are harmful to crops, and degradation of underlying groundwater by overloading the shallow soil profile and causing waste constituents (organic carbon, nitrate, other salts, and metals) to percolate below the root zone. Ordinarily, it is reasonable to expect some attenuation of various waste constituents that percolate below the root zone within the vadose (unsaturated) zone. Specifically, excess nitrogen can be mineralized and denitrified by soil microorganisms, organic constituents (measured as both BOD and volatile dissolved solids) can be oxidized, and some salinity species will undergo cation exchange with clay minerals, effectively immobilizing them.

75. Loading of BOD should be limited to prevent nuisance conditions. The maximum BOD loading rate that can be applied to land without creating nuisance conditions can vary significantly depending on the operation of the land application system. *Pollution Abatement in the Fruit and Vegetable Industry,* published by the United States Environmental Protection Agency (US EPA Publication No. 625/3-77-0007) (hereafter *Pollution Abatement*), cites BOD loading rates in the range of 36 lbs/acre-day to 600 lbs/acre-day but indicates the loading rates can be even higher under certain seasonal and soil/crop conditions.

76. Acidic soil conditions can be detrimental to land treatment system function, and may also cause groundwater degradation. If the buffering capacity of the soil is exceeded and soil pH decreases below 5, naturally occurring metals (including iron and manganese) may dissolve and degrade underlying groundwater. *Pollution Abatement* recommends that water applied to crops have a pH within 6.4 to 8.4 to protect crops from damage by food processing wastewater. Near neutral pH may also be required to maintain adequate active microbial populations in the soil. The pH of wastewater discharged to the LAAs has occasionally been outside the recommended range. However, there have been no apparent effects on the NyPa crop or groundwater quality.

ANTI-DEGRADATION ANALYSIS

77. State Water Resources Control Board Resolution No. 68-16 (“Policy with Respect to Maintaining High Quality Waters of the State”) (hereafter Resolution 68-16) prohibits degradation of high quality groundwater unless it has been shown that:

    a. The degradation is consistent with the maximum benefit to the people of the State;

    b. The degradation will not unreasonably affect present and anticipated future beneficial uses;

    c. The degradation does not result in water quality less than that prescribed in state and regional policies, including violation of one or more water quality objectives; and

d. The discharger employs best practicable treatment and control (BPTC) to minimize degradation.

78. The olive processing facility has discharged wastewater at the site since 1983, when the first WDRs were issued. There are no site-specific data with which to evaluate shallow groundwater quality at the site prior to that date. Although the site is hydrogeologically complex, evaluation of local and areal groundwater conditions determined that the background groundwater TDS concentration is 2000 mg/L , as discussed in Finding No. 66

79. Since adoption of the previous WDRs, the Discharger has implemented the following treatment and control measures to control or prevent water quality degradation:

    a. The Discharger has undertaken a long-term water conservation program. For the three-year period ending in August 2002 the average water use was 5,062 gallons per ton of olives processed. For the three-year period ending in August 2009 the average water use was less than 4,000 gallons per ton of olives processed. The Discharger states that 4,000 gallons per ton is a sustainable water usage rate for the facility.

    b. The Discharger has also undertaken a long-term chemical source reduction/control program. From 2004 through 2007, the yearly average FDS concentration of wastewater discharged from the processing plant ranged from 1,900 to 2,100 mg/L. In 2008 and 2009, the yearly average FDS concentration was 1,450 mg/L. During the same period, the annual salt mass discharged to the reservoir (measured as FDS) declined from over 1,300 tons per year to 880 tons in 2008[3], which is approximately a 32% reduction.

    c. The Discharger has planted a salt-loving perennial crop at the LAAs and has made efforts to increase the crop coverage to the maximum sustainable coverage considering the soil and water needs of the crop as well as the need to minimize leaching. The crop is periodically harvested for use as fodder, thereby removing some salt from the site.

    d. The Discharger has undertaken a pilot study to evaluate the potential for using heat energy from olive pits and the harvested crop to evaporate wastewater and generate electricity. The Discharger constructed a demonstration-scale plant (called the “Renewable Energy/Wastewater System” or RENEWS), which is capable of treating up to 6,000 gallons of waste water per day. The demonstration-scale RENEWS unit successfully reduced the FDS of one of the Discharger’s waste streams to below 100 mg/L. In December 2009 the Discharger contracted with a vendor to build a

[3] The total FDS mass discharged to the LAAs in 2007 and 2009 was substantially lower than 2008, but the processing plant was closed for extended periods during both of those years. Therefore, the annual FDS mass loading rate for those two years is not considered to be sustainable without impacting production unless additional treatment or source control is implemented.

RENEWS unit capable of treating 60,000 gallons per day. The unit is expected to be operational in July 2010. Based on the pilot study and demonstration-scale unit, the Discharger states that RENEWS could further reduce the salinity mass loading to the LAAs by up to 250 tons per year.

However, the Discharger has not committed to a time schedule for completion of the 60,000-gpd RENEWS system. This Order requires the Discharger to begin full scale operation of the 60,000 gpd RENEWS system or demonstrate that the full scale system is infeasible within two years of adoption of this Order.

The unlined wastewater treatment/storage reservoir does not incorporate any specific measures to reduce the potential for groundwater degradation. However, based on the finding that the wastewater treatment/storage reservoir has not caused unreasonable groundwater degradation or exceedance of a water quality objective (Finding Nos. 61 through 64), additional measures such as pond lining are not required at this time. However, this Order requires that the Discharger continue groundwater monitoring and re-evaluate groundwater quality annually. The groundwater limitations of this Order do not allow statistically significant increases in concentrations of waste constituents in groundwater. If groundwater monitoring data show that the discharge has violated the groundwater limitations of this Order, this Order may be reopened to add additional requirements that address the violations.

80. Constituents of concern that have the potential to degrade groundwater include salts (primarily FDS, sodium, and chloride) and nitrogen, as discussed below:

    a. The discharge to the wastewater treatment/storage reservoir has degraded groundwater quality and the discharge to the LAAs has the potential to degrade groundwater quality. This Order imposes concentration- and mass-based effluent salinity limits that do not allow a significant increase over the recently achieved sustainable levels cited above and will prevent degradation that exceeds water quality objectives. The Current WDRs and CDO regulate salinity primarily in terms of TDS. However, as noted in Finding No. 23, FDS is a better salinity indicator for this facility. The following table summarizes past and proposed salinity limits in terms of FDS. The comparison is based on a facility-specific TDS:FDS ratio of 1.92, which was provided in the RWD and FDS:sodium and FDS:chloride ratios calculated from the 2008 effluent monitoring data presented in Finding No. 24.

Regulatory Measure	Limit Type	Effluent Concentration Limit			
		TDS (mg/L)	**Sodium (mg/L)**	**Chloride (mg/L)**	**FDS (mg/L)**
1997 WDRs (Order No. 97-037)	Annual Average	None	None	None	1,264 [1]
	Maximum	None	None	None	1,340 [1]
WDRs Order No. R5-2002-0148	Maximum	2,047	597	601	1,068 [2]
CDO Order No. R5-2007-0139	Monthly Average	3,200	700	No change	2,200
This Order	Monthly Average	3,800 [2]	707 [3]	307 [4]	2,000

[1] The limits in the 1997 WDRs are expressed as dissolved inorganic solids (DIS), which is equivalent to FDS.

[2] Estimated equivalent concentration based on TDS:FDS ratio of 1.92.

[3] Estimated equivalent concentration based on FDS:sodium ratio of 2.83.

[4] Estimated equivalent concentration based on FDS:chloride ratio of 6.52.

The FDS limits of this Order are more stringent than those imposed by the CDO and should result in a significant decrease in the chloride concentration of the waste discharged to the LAAs. This Order does not impose separate effluent limits for sodium and chloride because FDS measures the overall salinity and the concentration of individual salinity constituents is expected to be relatively constant. However, based on the estimated equivalent sodium concentration, the FDS of this Order limits might allow a slight increase in the sodium concentration over that allowed by the CDO. The Discharger will be able to immediately comply with the FDS limits without further treatment or source control. As noted in Finding No. 79.d above, this Order does not allow statistically significant increases in concentrations of waste constituents in groundwater.

b. For nitrogen, the potential for unreasonable degradation depends not only on the quality of the treated effluent, but the ability of the vadose zone below the wastewater treatment/storage reservoir and LAAs to provide an environment conducive to nitrification and denitrification to convert the effluent nitrogen to nitrate and the nitrate to nitrogen gas before it reaches the water table. Groundwater monitoring data indicate that the discharge has not caused significant degradation due to nitrate. The NyPa grass grown at the LAAs should remove most of the nitrogen in the applied wastewater if the Discharger continues the current level of wastewater treatment and maintains adequate crop coverage. Given the soil type and depth to groundwater at the LAAs, subsequent denitrification in the vadose zone is expected to prevent unreasonable groundwater degradation at the LAAs. This Order requires that the Discharger continue to treat the wastewater and maintain adequate crop cover at the LAAs.

81. This Order does not allow any increase in the volume of waste or the mass of waste constituents discharged.

82. The previous WDRs allowed an increase in the discharge to 800,000 gpd as a monthly average flow conditioned on:

    a. Measurement of tailwater returned to the treatment/storage reservoir;

    b. Measurement of storm runoff water returned to treatment/storage reservoir; and

    c. Cessation of discharge into any reservoir or pond that has less than two feet of freeboard.

    This Order imposes lower effluent flow limits based on the hydraulic capacity of the existing system, with which the Discharger can comply.

83. This Order is consistent with the Basin Plan and Resolution No. 68-16, which allows some groundwater degradation because economic prosperity of local communities and associated industry is of benefit to the people of California. This Order establishes terms and conditions of discharge to ensure that the discharge does not unreasonably affect present and anticipated uses of groundwater and includes groundwater limitations that apply water quality objectives established in the Basin Plan to protect beneficial uses. This Order also establishes effluent limitations that are protective of the beneficial uses of the underlying groundwater and requires periodic re-evaluation of groundwater quality. As discussed in Finding No. 79, the Discharger has implemented certain best practicable treatment and control measures to minimize degradation and plans to further minimize potential degradation by operating a 60,000-gpd RENEWS system and increasing the LAA area to include the 11-acre “Checks” area, which has not been used since 2002.

OTHER REGULATORY CONSIDERATIONS

84. The State Water Board adopted Order No. 97-03-DWQ (NPDES General Permit No. CAS000001) specifying waste discharge requirements for discharges of storm water associated with industrial activities, and requiring submittal of a Notice of Intent by all affected industrial dischargers. The Discharger has obtained coverage under Order No. 97-03-DWQ.

85. Section 13267(b) of the California Water Code provides that: “In conducting an investigation specified in subdivision (a), the regional board may require that any person

who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge, waste outside of its region that could affect the quality of waters within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the regional board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports. In requiring those reports, the regional board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports".

The technical reports required by this Order and the attached "Monitoring and Reporting Program No. __" are necessary to assure compliance with these waste discharge requirements. The Discharger owns and operates the facility that discharges the waste subject to this Order.

86. The California Department of Water Resources sets standards for the construction and destruction of groundwater wells (hereafter DWR Well Standards), as described in *California Well Standards Bulletin 74-90* (June 1991) and *Water Well Standards: State of California Bulletin 94-81* (December 1981). These standards, and any more stringent standards adopted by the State or county pursuant to CWC Section 13801, apply to all monitoring wells.

87. On 28 February 1997, the Central Valley Water Board adopted a Negative Declaration for this project. The Negative Declaration described a discharge of 500,000 gpd to 200 acres of cropland, and wastewater constituent concentrations as follows: TDS 1280 mg/L, sodium 456 mg/L, chloride 228 mg/L, BOD 2,000 mg/L, nitrogen 1 mg/L, and electrical conductivity 2,500 umhos/cm. On 5 April 2001, the San Joaquin County Community Development Department adopted a Negative Declaration for construction of the treatment/storage reservoir. The discharge described in these WDRs is consistent with the Negative Declarations described above because:

    a. This Order doe not authorize expansion of the wastewater treatment/storage reservoir or land application areas.

    b. This Order limits the discharge flow to an equivalent daily flow of no more than 482,000 gpd as a yearly average, which is no more than the highest yearly average flow since 2002, and which is less than the flow limitation in the current WDRs (Order No. R5-2002-0148).

    c. This Order limits the annual FDS loading rate to the LAAs to a loading rate equivalent to the loading rate envisioned in the 1997 Negative Declaration for the irrigation disposal areas.

Therefore, the action to revise waste discharge requirements for this existing facility is exempt from the provisions of the California Environmental Quality Act (CEQA), in accordance with Title 14, California Code of Regulations (CCR), section 15301.

88. The process wastewater treatment and reuse facilities associated with the discharge authorized herein are exempt from the requirements of Title 27, Section 20005 et seq. The exemption is based on the following:

    a. The wastewater regulated by this Order does not need to be managed according to California Code of Regulations, Title 22, Division 4.5, Chapter 11 as a hazardous waste.

    b. Based on extensive technical studies of the wastewater quality, discharge operations, and site-specific geology and hydrogeology, the discharge authorized by this Order will not exceed water quality objectives. This Order ensures that discharges from the LAAs comply with the antidegradation policy. Therefore, the discharge to the LAAs is consistent with the Basin Plan and is exempt from Title 27 pursuant to Section 20090, subdivision (b).

    c. Groundwater monitoring demonstrates that discharges from the treatment/storage reservoir have not caused underlying groundwater to exceed Basin Plan objectives. This Order ensures that discharges from the reservoir comply with the antidegradation policy. Therefore, the discharge to the treatment/storage reservoir is consistent with the Basin Plan and is exempt from Title 27 pursuant to Section 20090, subdivision (b).

89. State regulations that prescribe procedures for detecting and characterizing the impact of waste constituents from waste management units on groundwater are found in Title 27. Although the wastewater treatment/storage reservoir and LAAs are exempt from Title 27, the data analysis methods of Title 27 are appropriate for determining whether the discharge complies with the terms for protection of groundwater specified in this Order.

90. Pursuant to California Water Code Section 13263(g), discharge is a privilege, not a right, and adoption of this Order does not create a vested right to continue the discharge.

PUBLIC NOTICE

91. All of the above and the supplemental information and details in the attached Information Sheet, which is incorporated by reference herein, were considered in establishing the following conditions of discharge.

92. The Discharger and interested agencies and persons have been notified of the intent to prescribe waste discharge requirements for this discharge, and they have been provided an opportunity for a public hearing and an opportunity to submit their written views and recommendations.

93. All comments pertaining to the discharge were heard and considered in a public meeting.

IT IS HEREBY ORDERED that WDRs Order No. R5-2002-0148 and Cleanup and Abatement Order No. 5-00-717 are rescinded and, pursuant to Section 13263 and 13267 of the California Water Code, Musco Family Olive Company and the Studley Company, their agents, successors, and assigns, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, shall comply with the following:

Note:
Other prohibitions, conditions, definitions, and some methods of determining compliance are contained in the attached "Standard Provisions and Reporting Requirements for Waste Discharge Requirements" dated 1 March 1991.

A. Discharge Prohibitions

1. Discharge of wastes to surface waters or surface water drainage courses is prohibited.

2. Discharge of reservoir seepage, wastewater, irrigation tailwater, or storm water runoff from any of the designated land application areas to any off-site area or drainage course is prohibited.

3. Bypassing the wastewater screen system or the wastewater treatment/storage reservoir is prohibited.

4. Discharge of domestic wastewater to the process wastewater treatment system or land application areas is prohibited.

5. Discharge of process wastewater to areas other than the designated LAAs described in Finding No. 32 is prohibited.

6. Discharge of process wastewater to any LAA not having a fully functional tailwater/runoff control system is prohibited.

7. Grazing of animals on the land application areas is prohibited unless the Executive Officer approves a *Land Management Plan* pursuant to Provision G.2.

8. Discharge of process wastewater to land overlying septic system leach lines or seepage pits is prohibited.

9. Discharge of waste classified as hazardous, as defined in Sections 2521(a) of Title 23, CCR, Section 2510, et seq., (hereafter Chapter 15), or ‘designated’, as defined in Section 13173 of the California Water Code, is prohibited.

B. Discharge Specifications

1. The flow of process wastewater and storm water from the processing facility to the wastewater treatment/storage reservoir shall not exceed the following limits:

Flow Measurement	Flow Limit
Total Annual Flow [1]	180 MG
Monthly Average Flow [2]	0..716 mgd

[1] As determined by the total influent flow for the calendar year.

[2] As determined by the total influent flow for the calendar month divided by the number of days in that month.

2. Neither the treatment nor the discharge shall cause a nuisance or condition of pollution as defined by California Water Code section 13050.

3. No waste constituent shall be released or discharged, or placed where it will be released or discharged, in a concentration or in a mass that causes violation of the Groundwater Limitations of this Order.

4. The Discharger shall continue to collect any water seepage from the toe drain of the wastewater treatment/storage reservoir and return it to the reservoir.

5. Nuisance odors originating at this facility shall not be perceivable beyond the limits of the property owned by the Discharger.

6. As a means of discerning compliance with Discharge Specification No. B.5, the wastewater from 1 to 2 feet below the surface of the wastewater treatment/storage reservoir shall maintain the following at all times:
   a. A dissolved oxygen concentration greater than 1.0 mg/L; and
   b. A pH value between 6.0 and 10.5.

7. The wastewater treatment/storage reservoir shall be managed to prevent breeding of mosquitoes. In particular:
   a. An erosion control program shall assure that small coves and irregularities are not created around the perimeter of the water surface.
   b. Weeds shall be minimized through control of water depth, harvesting, or herbicides.
   c. Dead algae, vegetation, and debris shall not accumulate on the water surface

8. The wastewater treatment/storage reservoir and the land application system shall have sufficient capacity to accommodate allowable wastewater flow, design seasonal precipitation, and seasonal ancillary inflow and infiltration during the wet season. Design seasonal precipitation shall be based on total annual precipitation using a return of 100 years, distributed monthly in accordance with historical rainfall patterns.

9. Freeboard shall never be less than two feet in any pond as measured vertically from the water surface to the lowest possible point of overflow.

10. On or about **1 November** each year, available wastewater treatment/storage reservoir storage capacity shall at least equal the volume necessary to comply with Discharge Specification Nos. B.8 and B.9.

11. The Discharger shall monitor sludge accumulation in the wastewater treatment/storage reservoir and shall periodically remove sludge as necessary to maintain adequate storage capacity.

12. The Discharger shall operate all systems and equipment to maximize treatment of wastewater and optimize the quality of the discharge.

13. The Discharger’s wastewater treatment system and land application system shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods with a 100-year return frequency.

C. Effluent Limitations

1. The FDS concentration of wastewater discharged from the RST to the wastewater treatment/storage reservoir shall not exceed 2,000 mg/L as a monthly average. Compliance with this requirement shall be determined using the arithmetic mean of all effluent FDS monitoring data for the calendar month.

2. The mass of FDS discharged from the RST to the wastewater treatment/storage reservoir shall not exceed an annual total of 1,055 tons. Compliance with this requirement shall be determined using the following formula:

$$M = \sum_{i=1}^{n} C_i V_i$$

Where M = total annual FDS mass;

C_i = arithmetic mean of FDS monitoring results for calendar month i;

V_i = total effluent flow to the RST for calendar month i;

i = the number of the month (i.e., January = 1, February = 2, etc.); and
n = 12.

3. The maximum total nitrogen loading to the LAAs shall not exceed the agronomic rate for the crop grown.

4. The maximum BOD_5 mass loading to each LAA shall not exceed any of the following:

   a. 300 lbs/acre on any single day;

   b. 100 lbs/acre/day as a 7-day average;

   c. The maximum loading rate that ensures that the discharge will not create a nuisance.

D. Land Application Area Specifications

1. The discharge shall be distributed uniformly on the LAAs described in Finding No. 32 in compliance with the Discharge Specifications.

2. Crops shall be grown on the LAAs. Crops shall be selected based on nutrient uptake capacity, tolerance to soil salinity and moisture conditions, and consumptive use of water and irrigation requirements. Cropping activities shall be sufficient to take up all the nitrogen applied. For NyPa forage, the Discharger shall maintain at least 51 percent coverage as a site-wide, area-weighted average. Crops shall be harvested and removed from the land application areas at least once per year prior to the winter rainy season.

3. The Discharger shall use soil moisture monitoring and soil sampling to determine soil fertility status and shall take the necessary steps to maintain fertility.

4. Irrigation shall not be performed within 24 hours of a forecasted storm, during a precipitation event, 24 hours after a precipitation event, or when the ground is saturated.

5. Hydraulic loading of wastewater and supplemental irrigation water (if used) shall be at reasonable agronomic rates designed to minimize the percolation of process wastewater and irrigation water below the root zone (i.e., deep percolation) and to minimize runoff.

6. The discharge of process wastewater, including runoff, spray or droplets from the irrigation system, shall not occur outside the boundaries of the land application areas.

7. Wastewater conveyance lines shall be clearly marked as such. Wastewater controllers, valves, etc. shall be posted with advisory signs; all equipment shall be of a type, or secured in such a manner, that permits operation by authorized personnel only.

8. No physical connection shall exist between wastewater piping and any domestic water supply or industrial supply well without an air gap or approved reduced pressure device.

9. The land application areas shall be managed to prevent breeding of mosquitoes. More specifically:
   a. All applied irrigation water must infiltrate completely within 24 hours.
   b. Ditches shall be maintained free of emergent, marginal, and floating vegetation.
   c. Low pressure pipelines, unpressurized pipelines, and ditches that are accessible to mosquitoes shall not be used to store wastewater.

10. Discharges to the land application areas shall be managed to minimize both erosion and runoff from the land application area.

11. There shall be no standing water in the land application areas 24 hours after wastewater is applied, except during periods of heavy rains sustained over two or more consecutive days.

12. The perimeter of the land application areas shall be bermed or graded to prevent ponding along public roads or other public areas.

13. The effect of the wastewater discharge on the soil pH shall not exceed the buffering capacity of the soil profile.

14. Application or impoundment of process wastewater shall not occur within 50 feet of any residential property boundary or occupied commercial building, unless it is demonstrated to the satisfaction of the Executive Officer that a shorter distance is justified.

E. Solids Disposal:

1. Sludge and other solids shall be removed from wastewater treatment equipment, sumps, etc. as needed to ensure optimal plant operation and adequate hydraulic capacity and shall be disposed of in a manner that is consistent with Title 27, Division 2, Subdivision 1 of the CCR and approved by the Executive Officer.

2. Treatment and storage of solids and sludge (including olive pits) shall be conducted in a manner that precludes infiltration of waste constituents into soils in a mass or concentration that will violate groundwater limitations.

3. Any storage of process wastewater solids or sludge (including olive pits) on the Discharger's property shall be temporary, controlled, and contained in a manner that minimizes leachate formation and precludes infiltration of waste constituents into soils.

4. Storage and disposal of domestic wastewater sludge (septage) shall comply with existing Federal, State, and local laws and regulations, including permitting requirements and technical standards. Sludge and other solids shall be removed from septic tanks as needed to ensure optimal operation and adequate hydraulic capacity. A duly authorized carrier shall haul sludge, septage, and domestic wastewater.

5. Any proposed change in solids use or disposal practice from a previously approved practice shall be reported to the Executive Officer at least 90 days in advance of the change.

F. Groundwater Limitations:

1. The discharge shall not cause a statistically significant increase in the concentration of the following constituents in any of the compliance monitoring wells specified in Monitoring and Reporting Program No. __ or subsequent revision thereto:

   a. Total dissolved solids;
   b. Ammonia nitrogen
   c. Nitrate nitrogen
   d. Iron;
   e. Manganese;
   f. Sodium;
   g. Chloride;
   h. Sulfate;
   i. Total alkalinity; and
   j. Total hardness.

   Compliance with this requirement shall be determined annually using an approved intrawell statistical analysis method based on all historical groundwater monitoring data and subsequent groundwater monitoring data obtained pursuant to Monitoring and Reporting Program No. __.

2. The discharge shall not cause groundwater to exhibit a pH of less than 6.5 or greater than 8.4 pH units.

3. The discharge shall not impart taste, odor, chemical constituents, toxicity, or color that creates nuisance or impairs any beneficial use.

G. Provisions:

1. All of the following reports shall be submitted pursuant to Section 13267 of the California Water Code and shall be prepared by a registered professional as described by Provision G.5.

   a. By **30 June 2010**, the Discharger shall submit a *Groundwater Limitations Compliance Assessment Plan.* The plan shall consist of identification of all groundwater zones that could be affected by a release from the site; identification of all proposed groundwater quality monitoring points; proposed annual groundwater quality evaluation methods; and proposed concentration limits for each constituent listed in Groundwater Limitation F.1.

   b. By **30 July 2010**, the Discharger shall submit a *Financial Assurance Report*. The report shall document and describe in detail the financial assurances in the form of an irrevocable fund or other mechanism(s) that the Discharger has created, with the Central Valley Water Board named as beneficiary, to ensure that funds are available to complete site closure in accordance with the Excavation and Offsite Disposal Alternative scope and cost estimate cited in Finding No. 67 of this Order. The Discharger shall create financial assurance instrument(s) such that the closure project is fully funded **by 30 December 2020**, allowing for reasonable inflation, in equal annual deposits. The Discharger may not use a Financial Means Test or similar method for providing financial assurances.

      If the Executive Officer subsequently approves a *Conceptual Site Closure Plan* and the cost and scope of the approved closure project differs from the Excavation and Offsite Disposal Alternative cited in Finding No. 67, the Discharger shall submit a revised *Financial Assurance Report* **within 120 days** of approval of the *Conceptual Site Closure Plan*.

   c. By **30 December 2010** and by 30 December each subsequent year, the Discharger shall submit a *Financial Assurance Account Annual Update Report* that demonstrates that the Discharger has increased the total amount of financial assurance in accordance with Provision G.1.b above.

   d. By **30 December 2010**, the Discharger shall submit a *Sludge Management Plan*. The plan shall describe in detail the results of a field investigation to determine the volume and dry mass of sludge contained in the wastewater treatment/storage reservoir. Based on that estimate, the plan shall present a feasibility analysis of options for removing and disposing of the biosolids before the accumulated sludge volume exceeds two percent of the permitted reservoir capacity (84 MG). The report shall include the following:

i. An estimate of the gross annual sludge generation rate and, if desired, annual mass reduction expected to be achieved through digestion that occurs within the reservoir. The estimate shall be based on the BOD mass loading rate to the reservoir, the sustainable BOD removal rate for the existing treatment system, and (as applicable) digestion that occurs in the reservoir.

ii. The recommended frequency for sludge removal and the recommended procedure for periodic assessment of the stored sludge volume as required by Monitoring and Reporting Program No. __.

iii. If the estimated volume of sludge in the reservoir exceeds two percent of the permitted reservoir capacity, a schedule for biosolids cleanout within the next 12 months (i.e., by **30 December 2011**).

e. By **30 March 2011**, the Discharger shall submit a *Conceptual Site Closure Plan*. The plan shall address the issues identified in Finding No. 67 and provide the following for both the Root Zone Salt Displacement and Excavation and Offsite Disposal alternatives:

i. A detailed description of the predesign work that will be required to support final design of the alternative;

ii. A detailed conceptual design based on currently available information about site conditions (including conceptual drawings for grading, and any other site work required);

iii. A description of anticipated permitting activities (e.g., CEQA, dam decommissioning);

iv. A detailed post-closure monitoring plan designed to demonstrate the long-term effectiveness of closure;

v. A detailed cost estimate for capital and annual post-closure monitoring and maintenance costs that includes documentation of specific materials and work required, estimated units of each material/work item, estimated unit cost, and extended cost; and

vi. An engineering economic analysis that determines, based on the cost estimates and reasonable annual cost escalation, the amount of financial assurances that must be in place by 30 December 2020.

f. By **30 March 2012**, the Discharger shall either: certify in writing that the 60,000-gpd RENEWS system has been constructed and is fully operational; or submit an *Infeasibility Report* detailing the Discharger's efforts to design, permit, construct, and/or sustainably operate the system, and a demonstration that it is not technically or administratively feasible to do so.

2. If the Discharger proposes to graze livestock on the LAAs, the Discharger shall submit a *Land Management Plan* that describes in detail the structural controls and/or operational practices that will be used to prevent crop damage, soil erosion and sedimentation, decreases in crop salt uptake, net decreases in nitrogen removal, and increases in subsurface salt movement associated with the presence of livestock.

3. If the Annual Monitoring Report submitted pursuant to Monitoring and Reporting Program No. __ shows any exceedance of the Groundwater Limitations of this Order, the Discharger shall submit a specific, detailed plan and schedule to come into compliance with the Groundwater Limitations, or a detailed evaluation that demonstrates that the Groundwater Limitations should be revised, **within 180 days** of the due date of the Annual Monitoring Report.

4. **At least 180 days prior** to any sludge removal and disposal, the Discharger shall submit a *Sludge Cleanout and Disposal Plan*. The plan shall include a detailed plan for sludge removal and disposal. The plan shall specifically describe the phasing of the project, measures to be used to control runoff or percolate from the sludge if it will be dried or temporarily stored on-site, and a schedule that shows how all sludge will be removed from the site for disposal prior to the onset of the next rainy season (1 October). The plan shall specify the proposed method of sludge disposal.

5. All technical reports required herein that involve planning, investigation, evaluation, or design, or other work requiring interpretation and proper application of engineering or geologic sciences, shall be prepared by or under the direction of persons registered to practice in California pursuant to California Business and Professions Code sections 6735, 7835, and 7835.1. To demonstrate compliance with Sections 415 and 3065 of Title 16, CCR, all technical reports must contain a statement of the qualifications of the responsible registered professional(s). As required by these laws, completed technical reports must bear the signature(s) and seal(s) of the registered professional(s) in a manner such that all work can be clearly attributed to the professional responsible for the work.

6. The Discharger shall comply with the Monitoring and Reporting Program No. __, which is part of this Order, and any revisions thereto as ordered by the Executive Officer. The Discharger shall maintain the groundwater monitoring system as shown on Attachment D, and shall replace any monitoring wells at any location from which representative samples cannot be collected for three consecutive quarters or more.

7. The Discharger shall comply with the "Standard Provisions and Reporting Requirements for Waste Discharge Requirements", dated 1 March 1991, which are attached hereto and made part of this Order by reference. This attachment and its individual paragraphs are commonly referenced as "Standard Provision(s)."

8. The Discharger shall submit to the Central Valley Water Board on or before each compliance report due date, the specified document or, if appropriate, a written report detailing compliance or noncompliance with the specific schedule date and task. If noncompliance is being reported, then the Discharge shall state the reasons for such noncompliance and provide an estimate of the date when the Discharger will be in compliance. The Discharger shall notify the Central Valley Water Board in writing when it returns to compliance with the time schedule.

9. The Discharger shall use the best practicable cost effective control technique(s) currently available to comply with discharge limits specified in this order.

10. As described in the Standard Provisions and Reporting Requirements, the Discharger shall report promptly to the Central Valley Water Board any material change or proposed change in the character, location, or volume of the discharge.

11. The Discharger shall report to the Central Valley Water Board any toxic chemical release data it reports to the State Emergency Response Commission within 15 days of reporting the data to the Commission pursuant to section 313 of the “Emergency Planning and Community Right to Know Act of 1986.”

12. In the event of any change in control or ownership of the facility, the Discharger must notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be immediately forwarded to the Central Valley Water Board. To assume operation as Discharger under this Order, the succeeding owner or operator must apply in writing to the Executive Officer requesting transfer of the Order. The request must contain the requesting entity's full legal name, the state of incorporation if a corporation, the name and address and telephone number of the persons responsible for contact with the Central Valley Water Board, and a statement. The statement shall comply with the signatory paragraph of Standard Provision B.3 and state that the new owner or operator assumes full responsibility for compliance with this Order. Failure to submit the request shall be considered a discharge without requirements, a violation of the California Water Code. Transfer shall be approved or disapproved by the Executive Officer.

13. The Discharger shall comply with all conditions of this Order, including timely submittal of technical and monitoring reports as directed by the Executive Officer. Violations may result in enforcement action, including Central Valley Water Board or court orders requiring corrective action or imposing civil monetary liability, or in

revision or rescission of this Order.

14. The Discharger shall maintain a copy of a current Operation and Maintenance Plan (O&M Plan) at the facility for reference by operating personnel who shall be familiar with its contents. The O&M Plan shall discuss all aspects of managing the discharge operation to comply with the terms and conditions of this Order and how to make field adjustments as necessary to preclude nuisance conditions. The O&M Plan shall also include the current cropping plan for each processing season.

15. A copy of this Order shall be kept at the discharge facility for reference by operating personnel. Key operating personnel shall be familiar with its contents.

16. The Discharger is ultimately responsible for the effectiveness of its treatment and control measures in assuring compliance with groundwater limitations, and is liable for remediation of any impact on groundwater not authorized herein. Failure to properly operate and maintain best practicable treatment and control, or failure of such measures to perform effectively, shall be grounds to rescind this Order, reclassify the waste and designated, and require compliance with Title 27 prescribed waste containment standards or initiate enforcement, as appropriate.

17. The Central Valley Water Board will review this Order periodically and may revise requirements when necessary.

I, PAMELA C. CREEDON, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on __.

PAMELA C. CREEDON, Executive Officer

1/14/2010